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### REMARKS

In the Office Action dated April 12, 2004, the Examiner rejects claims 1, 7, 9, 12-17, 21-24, 26, 27, 29, 30, 32 and 35 under 35 U.S.C. § 103(a). The Examiner objects to claims 5, 18-20, 31, 33 and 36. With this Amendment, claims 1, 14, 23 and 24 have been amended. After entry of this Amendment, claims 1, 5-9 and 12-36 are pending in the Application. It is respectfully submitted that the invention as defined by the claims is not rendered obvious by the cited references taken singly or in any permissible combination for the reasons as set forth in more detail hereinafter. Reconsideration of the Application as amended is respectfully requested.

The Examiner rejects claims 23, 24 and 34 under 35 U.S.C. § 103(a) as being unpatentable over Fukui et al. (4,894,546) in view of Martin et al. (6,027,663) and Eriksson (4,508,053). In the process of claim 23, the substrate surfaces are now described as substrate surfaces to be coated, wherein the substrate surfaces form a hollow cathode, and the treating step has been changed to the step of coating the substrate surfaces by a hollow-cathode glow discharge, said discharge activated by at least one of a DC voltage, a pulsed DC voltage, an AC voltage and microwaves. In the device of claim 24, the at least one substrate is now described as defining a discharge region enclosed on at least two sides by substrate surfaces to be coated wherein the substrate surfaces form a hollow cathode, and wherein the substrate surfaces are coated by a hollow-cathode glow discharge activated by at least one of a DC voltage, a pulsed DC voltage, an AC voltage and microwaves.

It is respectfully submitted that the Examiner's combination fails to teach or suggest these features of claims 23, 24 and dependent claim 34. With respect to claim 23, the Examiner equates the hollow cathode of Fukui et al. with a substrate. The surfaces of the hollow cathode are not coated in a coating step. Instead, the hollow cathode of Fukui et al. is an ion source that discharges an ion beam in the axial direction of the cathode. (Abstract, Fig. 1). No coating occurs of the hollow cathode. Similarly, and with respect to claim 24 and its dependent claim 34, Fukui et al. fails to teach or suggest that the hollow cathode surfaces are coated by a hollow-cathode glow discharge. Even if there were some suggestion or motivation to combine Martin et al. and Eriksson with Fukui et al., the combination would still fail to teach or suggest

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this feature because it is completely contrary to the teachings of Fukui et al., which is to discharge the ion stream generated by the sputtering of the hollow cathode. Thus, claims 23, 24 and 34 are allowable over the prior art of record.

In addition, it is submitted that the Examiner's rejection of claims 23 and 24 is unsupported by the references. The Examiner states that it would be obvious to one of ordinary skill in the art to include outside the discharge region the means for placing the gas in the region and means for removing the gas from the region of claim 23 and the means for supplying gas and the means for removing gas of claim 24. The Examiner reasons that this would result in a reasonable expectation of success because Fukui et al. does not teach, mention or suggest that the described features are *inside* the region, but teaches *generally* that gas must come in and go out. He further reasons that this change would result in benefits because it would not subject the described features to sputtering and/or ionization due to locating the means within the discharge region. It is submitted that the Examiner has used impermissible hindsight in an attempt to render the claims obvious. Fukui et al. does not just fail to teach, mention or suggest that the described features are *inside* the region, it fails to teach, mention or suggest that they are *outside* the region. The Examiner's statement that there is an expectation of success is unupportable. There is no dispute that during the lengthy prosecution of this case, the Examiner has cited a multitude of references. In this Office Action alone, the Examiner has cited nine separate references but has cited none of them as showing the claimed features. Given these contrary teachings of the art, it is clear that no reasonable expectation of success exists. Further, the Examiner is using the Applicants' own teachings against them with his second rationale. No where does Fukui et al. or any permissible combination of references teach or suggest the undesirability of including the described features inside the discharge region. The Examiner's cited portion of the text of Fukui et al. merely recites the desirability of using a material for the cathode that will be the same as the metal vapor introduced therein because it will be sputtered and ionized. If this suggests anything, it suggests that any other components inside the discharge area should be similarly constructed, not that components should not be placed therein. Only the Applicants have noted the desirability

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of the features in the combination claimed. To the extent that the Examiner maintains this rejection, the Applicants respectfully request a reference showing the claimed features.

The Examiner rejects claim 1 and its dependent claims 7, 9, 12, 13, 26 and 27 under 35 U.S.C. § 103(a) as being unpatentable over Fukui et al. in view of Martin et al. and Eriksson and further in view of Jung (DE 4235953 A1). The Examiner states that the combination of Fukui et al., Martin et al. and Eriksson teach all of the features of claim 1 and states that it would have been obvious to one of ordinary skill in the art to use two flat, parallel substrates as the hollow cathode in the process/device of the combination with the reasonable expectation of successfully and advantageously using a hollow cathode arrangement that is simple, inexpensive and has a planar construction that facilitates cooling. The Examiner bolsters this reconstruction of the Applicants' invention by stating that the cooling facilitation taught by Jung would be beneficial in the process/device of Fukui et al., which is directly concerned with cooling the hollow cathode.

First, claim 1 has been amended to such that the restricting step states that it is restricting the discharge region on at least two opposite sides by surfaces to be coated. Further, claim 1 now requires that the process include the step of coating the surfaces to be coated by a hollow-cathode glow discharge. As discussed with respect to claim 23, surfaces of the hollow cathode, which the Examiner equates to substrate surfaces, are not coated in a coating step. Instead, the hollow cathode of Fukui et al. is an ion source that discharges an ion beam in the axial direction of the cathode. (Abstract, Fig. 1). No coating occurs of the hollow cathode in any permissible combination of Fukui et al., Martin et al. and Eriksson. In addition, this feature is neither taught nor suggested by Jung in the proposed combination with these references because Jung has as its purpose to produce thin films or coatings for a surface other than the hollow cathode. (See Fig. 5, no. 7).

In addition to the foregoing, the Examiner's inclusion of the linear hollow cathode of Jung with the combination of Fukui et al., Martin et al. and Eriksson is not suggested by the prior art. In fact, it is taught away from in Fukui et al. The Examiner states as motivation that Fukui et al. is concerned with cooling the hollow cathode. However, this is not the only or even a

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primary concern of Fukui et al. Fukui et al. complains about inability of the prior art to obtain an ion beam having a circular cross section of a considerably large diameter, and states the purpose of the invention therein as to overcome this problem. (Col. 1, ll. 35-39 and col. 2, ll. 18-23). A high degree of vacuum is also a goal. (Col. 1, line 65 to col. 2, line 23). The inclusion of flat, parallel substrate surfaces to form a hollow cathode does not produce an ion beam having a circular cross section according to the Figure in Jung. Thus, such surfaces would defeat this goal of Fukui et al. Further, the inclusion of flat, parallel substrate surfaces would likely reduce the vacuum over the cylindrical, mostly sealed hollow cathode of Fukui et al. Moreover, even though Jung says that the construction facilitates target cooling, there is no reason to believe that the flat, parallel substrate surfaces would be cooled any more efficiently than the cylindrical hollow cathode of Fukui et al. For the foregoing reasons, claim 1 and its dependent claims 7, 9, 12, 13, 26 and 27 are allowable over the prior art of record.

In addition to the foregoing, it is respectfully submitted that the Examiner's statement in rendering claim 27 obvious that forming a hollow cathode out of two, planar, parallel targets is equivalent to restricting the discharge region of two, opposed parallel sides by two band-shaped substrates is based upon personal knowledge, and is not based upon any teaching or suggestion in the art. The Applicants respectfully request that the Examiner provide a supporting reference showing the step of restricting the discharge region on two opposed, parallel sides by at least one band-shaped substrate or a declaration with supporting facts pursuant to 37 C.F.R. § 1.104(d)(2) to the extent the Examiner maintains his rejection of this claim.

The Examiner rejects claim 14 and its dependent claims 15-17, 29 and 30 under 35 U.S.C. § 103(a) as being unpatentable over Fukui et al. in view of Martin et al. and Eriksson and further in view of Jung. Claim 14 has been amended such that the device includes substrate surfaces forming a hollow cathode used to enable a hollow-cathode glow discharge, and the at least one substrate is surface coated by the hollow-cathode glow discharge. It is respectfully submitted that as described with respect to claim 1, there is no teaching or suggestion in the art to include such features in any permissible combination of the cited references. In addition, claim 14 includes the feature that the substrate surfaces are supplied by one of two flat parallel substrates

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and at least one continuously moving band-shaped substrate. For the reasons stated above with respect to claim 1, the Examiner's combination fails to teach or suggest this feature of claim 14. Thus, the invention of claim 14 and its dependent claims 15-17, 29 and 30 is patentable over the prior art of record.

In addition, and with respect to claim 30, it is respectfully submitted that the Examiner has failed to cite a reference including the feature that the at least one substrate is at least one band-shaped substrate, and the feature that the discharge region is enclosed by two opposed, parallel sides by the at least one band-shaped substrate. The Examiner is respectfully requested to provide a reference showing these features or to provide a declaration with supporting facts pursuant to 37 C.F.R. § 1.104(d)(2) to the extent the Examiner maintains his rejection of this claim.

The Examiner rejects claim 32, which depends from claim 23, and rejects claim 35, which depends from claim 24, under 35 U.S.C. § 103(a) as being unpatentable over Fukui et al. in view of Martin et al. and Eriksson and further in view of Jung. Initially, it is respectfully submitted that the inclusion of Jung also fails to teach or suggest all of the features of claims 23 and 24 missing from the cited combination of Fukui et al., Martin et al. and Eriksson as discussed with respect to claims 23 and 24. As discussed with respect to claims 27 and 30, the Examiner's reliance on Jung's teachings and personal knowledge is insufficient to prove that the prior art teaches or suggest either the steps of claim 32 of providing the substrate surfaces using at least one band-shaped substrate and of restricting the discharge region on two opposed, parallel sides by the at least one band-shaped substrate and the features of claim 35 of at least one substrate being at least one band-shaped substrate and a discharge region enclosed by two opposed, parallel sides by the at least one band-shaped substrate. The Applicants respectfully request that the Examiner provide a reference showing these features or provide a declaration with supporting facts pursuant to 37 C.F.R. § 1.104(d)(2) to the extent the Examiner maintains his rejection of these claims.

The Examiner rejects claims 6, 25 and 28 under 35 U.S.C. § 103(a) as being unpatentable over Fukui et al. in view of Martin et al. and Eriksson, further in view of Jung, and

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further in view of Fuke (4,794,612) or Kohler et al. (5,286,534). Claims 6 and 25 depend from claim 1, and claim 28 depends from claim 14. Thus, each is allowable based upon dependence from those claims because the addition of either Fuke or Kohler et al. to the combination of Fukui et al., Martin et al. and Eriksson is not suggested or motivated by the prior art. Fukui et al. states that its design increases the diameter of the hollow cathode body to compensate for a reduction in gas quantity. (Col. 3, ll. 7-14). Fukui et al. claims invention in this increased diameter. (See col. 2, ll. 5-24 and claims 1, 5, 9 and 11). Thus, even if Fuke or Kohler et al. teaches or suggests typical diameters within the ranges claimed by the Applicants, Fukui et al. teaches away from using "typical" diameters, and the combination would not include such diameters. Claims 6, 25 and 28 are allowable over the prior art of record.

The Examiner rejects claim 8 under 35 U.S.C. § 103(a) as being unpatentable over Fukui et al. in view of Martin et al. and Eriksson, further in view of Jung, and further in view of either Mikalesen et al. (4,824,544) or Chodil (3,999,094). Claim 8 depends from claim 1 and includes all the features therein. As mentioned previously, the combination of Fukui et al., Martin et al., Eriksson and Jung fail to teach or suggest all the features of claim 1. The addition of Mikalesen et al. or Chodil to this combination also fails to teach or suggest those features. Further, it is respectfully submitted that there is no motivation to combine these references as suggested by the Examiner. First, Chodil does teach a hollow cathode 10 grounded through a current-limiting resistor 10R. However, an igniter wire 11 protrudes into the cavity 13 enclosed by the cathode 10, and grid 14 is coupled to a source 20 of a DC voltage of 500 volts. (Col. 2, ll. 45-62). There is no teaching or suggestion in Chodil that Fukui et al. would work without these additional features, and it would not be obvious to include these features in Fukui et al. because, *inter alia*, the grid 14 would likely adversely affect the desired circular shape and composition of the ion beam of Fukui et al. With respect to Mikalesen et al., the hollow cathode can be electrically grounded and require no power supply to operate, but it requires an anode in the form of the array 34. (Col. 5, line 66 - col. 6, line 3). There is no teaching or suggestion in Mikalesen et al. that Fukui et al. would work without this additional feature, and it would not be obvious to

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include in Fukui et al. because it would likely adversely affect the desired circular shape of the ion beam of Fukui et al. Thus, the invention of claim 8 is patentable over the prior art of record.

The Examiner rejects claims 21 and 22 under 35 U.S.C. § 103(a) as being unpatentable over Fukui et al. in view of Martin et al. and Eriksson, further in view of Jung, and further in view of Helmer et al. (5,482,611). Each of these claims depends from claim 14. It is respectfully submitted that the addition of Helmer et al. fails to teach or suggest the features of claim 14 missing from any permissible combination of Fukui et al., Martin et al., Eriksson, and Jung as discussed with respect to claim 14. In addition, it is respectfully submitted that there is no teaching or suggestion in any of Fukui et al., Martin et al., Eriksson, or Jung that parasitic discharges exist such that it would be desirable to include the walls 192 and 193 suggested by Helmer et al. Further, claim 21 requires that the claimed deflection elements be located in the region of the sides of the discharge region on restricted by the substrate surfaces. The walls 192 and 193 are not so located. They surround the input conduit 160 and output conduit 163 that provide water or other suitable coolant fluid to the system.

The Examiner indicates that claims 5, 18-20, 31, 33 and 36 contain allowable subject matter. The Applicants have not amended the claims to independent form because they are each dependent from allowable claims.

It is respectfully submitted that this Amendment traverses and overcomes all of the Examiner's objections and rejections to the application as originally filed. It is further submitted that this Amendment has antecedent basis in the application as originally filed, including the specification, claims and drawings, and that this Amendment does not add any new subject matter to the application. Reconsideration of the application as amended is requested. It is respectfully submitted that this Amendment places the application in suitable condition for allowance; notice of which is requested.

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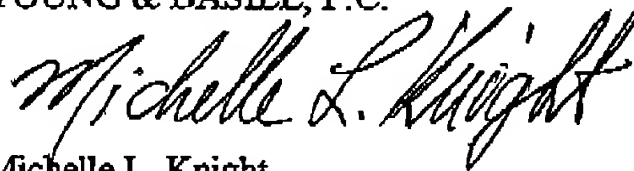
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If the Examiner feels that prosecution of the present application can be expedited by way of an Examiner's amendment, the Examiner is invited to contact the Applicants' attorney at the telephone number listed below.

Respectfully submitted,

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